

## PROTECTIVE CLOTHING, IN PARTICULAR GLOVE

### SPECIFICATION

The invention relates to a glove with sleeve.

Articles of clothing that protect individuals using motor saws against cuts are known in the art. The design of such cut-resistant protective clothing has been described, for example, in European Standard EN 381-4:1995. The protective clothing is comprised of fabric, knitwear or thread composites made of synthetic, in part high-strength fibers.

A special protective effect is achieved by having the serrated teeth snag one or more fibers and tear them out of the composite. These torn-out fiber bundles block the bearings or chain guides until the tool ceases to operate (DE 100 36 488 A1).

The upper material of this protective clothing generally consists of a mixture of cotton and synthetic fibers, which facilitates wearing comfort.

Protective clothing is also worn in another area, specifically relating to individuals involved in rescue or firefighting operations. The design of this type of protective clothing is described, for example, in European Standards EN 469 and EN 531. As a rule, protective clothing for rescue operations has the following features:

- incombustible,
- afterburn/afterglow time under 2 seconds,
- does not melt,
- does not drip,
- does not ignite,
- very high heat transfer resistance,
- long-lasting water and oil-repelling properties,
- highly visible through the use of a combination of reflective and persistent materials.

Protective clothing for firefighters designed to provide thermal insulation is known, for example, from DE 694 17 757 T2.

Flame-retardant yarns and fabrics manufactured from them are known from DE 100 38 030.

In rescue operations requiring the use of handheld power tools, e.g., motor saws, rescue workers use the currently available protective clothing described above. In this case, rescue workers must do without features of protective clothing for rescue operations. In particular the lack of protection against fire and melting makes it impossible to use the cut-resistant protective clothing in all necessary operations.

Another problem with protective clothing, in particular gloves, is that the protective means do not effectively safeguard the wrist and lower arm areas against injuries caused by motor saws, for example. When working with an outstretched arm, the sleeves of a cut-resistant protective jacket slide back, generally resulting in a gap between the jacket and glove, so that the wrist and/or lower arm is unprotected in this area.

While DE 78 19 843 U1 discloses a glove with an outer sleeve, the latter only provides protection against water.

DE 29 901 662 U1 proposes a glove for use in firefighting.

Therefore, the object of the invention is to provide a glove that simultaneously satisfies the different requirements.

A glove with the features in claim 1 is proposed for achieving this object.

According to the invention, the glove has a sleeve designed with a first protective surface, in particular to protect the lower arm, or the sleeve itself is designed as a protective surface, in particular to protect the lower arm and/or wrist. In a further development, the glove is designed with a second protective surface, in particular a salient bracket, in particular for the back of the hand and/or back of the wrist. The protective surfaces are here designed with a cut-resistant protective material layer and a fire and/or melt-resistant protective

layer, thereby providing effective protection for a hand or a wrist and lower arm. The protective surfaces are preferably secured to the side of the glove, wherein a zipper and/or Velcro seal can be used for attachment purposes. It is also conceivable to sew or adhesively bond the protective surface to the glove. The second protective surface lies directly on the back of the glove, wherein the second protective surface at least matches the back surface of the glove. The finger ends of the glove are preferably covered by the second protective surface. Since the protective surfaces are only fixed on the back or sides of the glove, wearing comfort is not significantly impaired in any way. The significant advantage to the sleeve according to the invention as the first protective surface is that no area, e.g., the wrist or lower arm, can be exposed and unprotected while working if a protective jacket slides up. Since the sleeve extends from the back of the glove to the area of the lower arm, there is never the danger that mechanical and/or thermal exposure might injure an area of the hand or arm.

In another preferred embodiment, the width of the first protective surface is such that a lower arm is completely enveloped by the first protective surface. In addition, the length of the first protective surface corresponds to at least half the length of the lower arm. Dimensioning the protective surface or sleeve in such a way provides a generous protective surface that in particular protects the lower arm all around and over a sufficient length.

It is advantageously provided that the sleeve has fixing means for adjustment to the contour of the lower arm. This fixing means can be an elastic strip and/or Velcro strip. Since lower arms generally vary in diameter, a fixing means ensures that the sleeve cannot be put on every lower arm. This prevents the individual wearing the glove from getting snagged on some object while working.

The solution according to the invention is to combine a material layer required to fabricate cut-resistant protective clothing with a material layer required to achieve protection against fire and melting, thereby yielding an optimum protective glove.

Advantageous further developments and embodiments are described in the subclaims.

The drawings illustrate exemplary embodiments of the invention. Shown on:

- Fig. 1 is a diagrammatic view of a glove to which a sleeve is secured;  
Fig. 2 is a protective surface structure according to Fig. 1 before secured  
to the glove;  
Fig. 3 is a diagrammatic view of a cross section through a protective tex-  
tile material according to the invention.

Fig. 1 shows an exemplary embodiment of a leather glove 20, on which a sleeve 21 is arranged. The glove 20 is a five-fingered glove with a back surface against which a second protective surface 23 directly abuts, assuming the form of a bracket. A first protective surface 22 adjoins in the opposite direction to the fingers as a sleeve 21, which covers a wrist under the sleeve 21 as well as a lower arm. The sleeve 21 here consists of a material that ensures protection against both cuts and flames.

In this exemplary embodiment, the second protective surface 23 is sewn to the side of the glove 20, ensuring a reliable attachment. The upper 24 and lower 25 area of the first protective surface 22 are also sewn together, so that the first protective surface 22 assumes the shape of a pipe when sewn together. A hand with arm can be introduced into this glove-sleeve unit, so that the back of the hand is protected by the second protective surface 23, and the wrist and lower arm area are protected by the first protective surface 22. The second protective surface 23 on Fig. 1 has a surface that essentially corresponds to the back of the glove, wherein the second protective surface 23 can also cover the finger ends of the glove 20.

On Fig. 1 and 2, the first protective surface 22 of the sleeve 21 has a width B sufficient to completely envelop the lower arm. This means that no point around the periphery of the lower arm can be injured, e.g., by a power tool. In addition, the first protective surface 22 has a length L of about 20 cm. This length is roughly half the length of the lower arm. By generously dimensioning the sleeve 21 in this way, no gap arises between the glove 20 and a protective jacket resting against the arm, for example, while working with an arm extended.

It is advantageous that the sleeve 21 have at least one fixing means with which the sleeve 21 can be adjusted to the contour of the lower arm in the area of the

first protective surface 22 (not explicitly shown in the figures). A Velcro or elastic strip is here conceivable.

To achieve the widest possible range of application for the glove according to the invention, the latter can of course also be designed as a three-fingered glove or a mitten in varying overall lengths.

Fig. 3 shows a purely diagrammatic view of the used protective textile material 100.

The structural design is here such that the outer fabric 10 consists of a fireproof material according to EN 469/531, e.g., "Nomex III". One example is "Nomex III" from DuPont. A cut-resistant insert according to EN 381 is provided on the inside as a cut-resistant protective material 11.

Only the basic structural design is here involved, of course. The article of clothing can be fabricated out of multi-layer material, wherein a flame-resistant outer fireproof material 10, a moisture barrier (not shown in the drawing) and thermally insulating lining (also not shown) can be sequentially provided, then followed by the cut-resistant insert comprised of a cut-resistant protective material 11, in which a layer consisting of lining threads and loops that blocks the tool in the event of contact is arranged over a base textile material on the machine side, i.e., directed toward the outer fireproofing fabric, to protect against injuries caused by power tools or power equipment such as chainsaws or circular saws. An inner lining (also not shown) can then be provided on the inside to enhance wearing comfort.

To expand the applicability of such an article of clothing, the cut-resistant insert can be replaced by a bullet and bayonet proof insert, so that this clothing can also be used in military or police rescue operations in crisis areas.

### Reference List

- 100 Protective textile material
- 10 Fireproof material
- 11 Cut-resistant protective material
- 20 Glove
- 21 Sleeve
- 22 First protective surface
- 23 Second protective surface
- 24 Upper area
- 25 Lower area
- 26 Bracket
- L Length
- B Width